APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/273,806	03/22/1999	KENNETH J. DUDA	CIS-057	7598

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EXAMINER
NGUYEN, VAN H

ART UNIT	PAPER NUMBER
2126	

DATE MAILED: 03/24/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/273,806	Applicant(s) DUDA ET AL.
	Examiner VAN H NGUYEN	Art Unit 2126

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _3/22/99_.
2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.
3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-57_ is/are pending in the application.
    4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5)☐ Claim(s) _____ is/are allowed.
6)☒ Claim(s) _1-57_ is/are rejected.
7)☐ Claim(s) _____ is/are objected to.
8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.
10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.
    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
    a)☐ All   b)☐ Some * c)☐ None of:
        1.☐ Certified copies of the priority documents have been received.
        2.☐ Certified copies of the priority documents have been received in Application No. _____.
        3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _4-7 & 9-10_.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1.   This Office Action is in response to the application filed on March 22, 1999. Claims 1-57

are presented for examination.

Specification

2.   The abstract of the disclosure is objected to because it *exceeds the limit of 150 words.*

Correction is required. See MPEP § 608.01(b).

Claim Rejections - 35 USC § 101

3.   35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or
> any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and
> requirements of this title.

4.   Claims 1-2 and 30-31 are rejected under 35 U.S.C. 101 because the claimed invention is

directed to non-statutory subject matter.

5.   As to claim 1, the claim reads on a mental process or the manipulation of an abstract idea.

The claim limitations are not explicitly directed toward steps being implemented on a computer,

computer readable medium, or other statutory device. As such, they could be carried out

mentally. For example, a person could develop a scheduler for *"scheduling a resource among a*

plurality of elements" in his/her mind, and develop the scheduling mentally. In the preamble,

"*scheduling a resource among a plurality of elements*" does not make the claim statutory

because a mental process can also *schedule a resource among a plurality of elements*.

6.   As to claims 2 and 30-31, they also read on mental process, and are rejected under the

same rationale.

Claim Rejections - 35 USC § 112

7.   The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the
> subject matter which the applicant regards as his invention.

8.   Claims 16-29 and 45-54 are rejected under 35 U.S.C. 112, second paragraph, as being

indefinite for failing to particularly point out and distinctly claim the subject matter which

applicant regards as the invention.

9.   Claims 16 and 45 recite the limitation "the bandwidth" (in line 2). There is insufficient

antecedent basis for this limitation in the claims.

10.   Claims 17-29 and 46-54 are rejected for fully incorporating the deficiencies of their base

claims.

Claim Rejections - 35 USC § 103

11.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth
> in section 102 of this title, if the differences between the subject matter sought to be patented and the prior
> art are such that the subject matter as a whole would have been obvious at the time the invention was made
> to a person having ordinary skill in the art to which the subject matter pertains. Patentability shall not be
> negatived by the manner in which the invention was made.

12.   Claims 1-15, 30-44, and 55-57 are rejected under 35 U.S.C. 103(a) as being unpatentable

over **Jones et al.** (U.S. 5, 812,844).

13.   As to claim 1, Jones teaches the invention substantially as claimed including a method

for scheduling a resource among a plurality of elements *(abstract),* the method including steps

of:

        - detecting expiration of a period-of-use of the resource, the resource allocated to an

active one of the plurality of elements for the period-of-use *(col.4, line 62-col.5, line 29 and*

col.7, lines 19-54);

        - updating a measure-of-use of the resource for the active one of the plurality of elements

responsive to the period-of-use and a measure-of-use adjustment *(fig. 7 and associated text);* and

        Jones does not explicitly teach "assigning one of the plurality of elements to use the

resource for a second period-of-use responsive to the measure-of-use and an element-specific

selection adjustment for each element in the plurality of elements."

Jones, however, discloses *"the scheduler moves the thread on the processor list to the ready list, and moves the thread having the earliest restart time on the ready list to the processor list "* *(col.12, lines 1-28)*.

It would have been obvious to one of ordinary skill in the art to have applied the teaching of Jones for *the assigning step* in order to provide a means for efficiently allocating the processor to a thread for the appropriate amount of time without having to interrupt the thread to reevaluate the schedule.

14.   As to claim 2, Jones teaches the period-of-use is a scheduled period-of-use *(col.5, lines 57-65 and col.12, lines 1-28)*.

15.   As to claim 3, Jones teaches the plurality of elements is a plurality of threadsof-execution and the resource is time available to a central processor unit to execute the plurality of threads-of-execution *(abstract and col.6, lines 56-67)*.

16.   As to claim 4, Jones teaches updating a virtual time for the active one of the plurality of threads-of execution responsive to the period-of-use *(fig. 7 and associated text)*; and wherein the step of assigning one of the plurality of elements further includes determining an effective virtual time responsive to the virtual time and the element- specific selection adjustment where the element-specific selection adjustment is a borrowed virtual time *(col.12, lines 1-28)*.

17.   As to claim 5, Jones teaches specifying the borrowed virtual time by one of the plurality of threads-of-execution *(col.9, line 32-col.10, line 24)*.

18.   As to claim 6, Jones teaches adding a new thread to the plurality of threads-of-execution by a parent thread; and initializing the virtual time for the new thread using the virtual time of the parent thread *(col.col.11, line 26-col.12, line 28)*.

19.   As to claim 7, Jones teaches the plurality of threads-of-execution includes a set of ready

threads and a set of blocked threads *(figs. 9C-9D and associated text)*.

20.   As to claim 8, Jones teaches adjusting each of the set of blocked threads by an adjustment

value *(figs. 9C-9D and associated text)*.

21.   As to claim 9, Jones teaches updating a system reference-use of the resource *(fig. 2 and*

associated text).

22.   As to claim 10, Jones teaches determining that one of the set of blocked threads has

become ready; and updating, responsive to the step of determining, a virtual time for the one of

the set of blocked threads or to the system reference-use as adjusted by a lag limit *(figs. 9C-9D*

and associated text).

23.   As to claim 11, Jones teaches (a) determining that one of the set of blocked threads had

become blocked; (b) saving the system reference-use and a current real-time value associated

with the one of the set of blocked threads; (c) determining that the one of the set of blocked

threads has become ready; and (d) updating a virtual time for the one of the set of blocked

threads responsive to step (c) and further responsive to the saved system reference-use, the saved

current real-time, and the system reference-use *(figs. 9C-9D and associated text)*.

24.   As to claim 12, Jones teaches the system reference-use is updated to converge

towards a virtual time average over the set of ready threads *(figs. 9C-9D and associated text)*.

25.   As to claim 13, Jones teaches the step of updating the system reference-use is

accomplished substantially in accordance with:

reference-use=max(reference-use,

min(reference-use+R+RCost, EVT));

where reference-use is the system reference-use, R is a convergence rate, RCost is

a resource usage, and EVT is an effective virtual time, and the resource usage is a

function of the period-of-use and the measure-of-use adjustment assigned to the

active one of the plurality of threads-of-execution *(fig. 7 and associated text)*.

26.   As to claim 14, Jones teaches the step of updating the system reference-use is

accomplished substantially in accordance with:

reference-use += max(-MaxChange,

min(MaxChange, meanAVT-reference-use));

where reference-use is the system reference-use, MaxChange is responsive to a resource usage,

and MeanAVT is an average AVT over a set of the plurality of elements, and the resource usage

is a function of the period-of-use and the measure-of-use adjustment assigned to the active one of

the plurality of threads of-execution *(fig. 7 and associated text)*.

27.   As to claim 15, Jones teaches adding a new thread to the plurality of

threads-of-execution; and initializing the virtual time for the new thread using the system

reference use *(col.col.11, line 26-col.12, line 28)*.

28.   As to claims 30-44, note the rejection of claims 1-15 above. Claims 30-44 are the same

as claims 1-15, except claims 30-44 are apparatus claims and claims 1-15 are method claims.

29.   As to claims 55-57, note the rejection of claims 1-3 above. Claims 55-57 are the same as

claims 1-3, except claims 55-57 are computer program product claims and claims 1-3 are method

claims.

30.   Claims 16-29 and 45-54 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Jones et al. in view of **Chow et al.** (U.S. 6,438,134 B1).

31.   As to claim 16, Jones does not explicitly teach the plurality of elements is a plurality of

queues and the resource is the bandwidth of an output port of a data switch.

Chow teaches the plurality of elements is a plurality of queues and the resource is the

bandwidth of an output port of a data switch *(abstract and col.col.3, lines 16-47)*.

It would have been obvious to a person of ordinary skill in the art at the time the

invention was made to combine the teachings of Jones and Chow because Chow's teaching

would have provided a more efficient bandwidth distribution.

32.   As to claim 17, the rejection of claim 4 above is incorporated herein in full. Claim 17

further recites the plurality of queues.

Jones does not explicitly teach the plurality of queues.

Chow teaches the plurality of queues *(col.7, lines 53-67)*.

It would have been obvious to a person of ordinary skill in the art at the time the

invention was made to combine the teachings of Jones and Chow because Chow's teaching

would have provided a more efficient bandwidth distribution.

33.   As to claim 18, Jones does not explicitly teach the period-of-use is a transmission time

period required to transfer one or more data packets from one of the plurality of queues to the

output port.

Chow teaches the period-of-use is a transmission time period required to transfer one or more data packets from one of the plurality of queues to the output port *(fig. 4 and associated text)*.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teachings of Jones and Chow because Chow's teaching would have provided a more efficient bandwidth distribution.

34.   As to claim 19, Jones does not explicitly teach the plurality of queues includes a set of non-empty queues and a set of empty queues.

Chow teaches the plurality of queues includes a set of non-empty queues and a set of empty queues *(col.6, lines 13-39)*.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teachings of Jones and Chow because Chow's teaching would have provided a more efficient bandwidth distribution.

35.   As to claim 20, it includes the same limitation as claim 7 above, and is similarly rejected under the same rationale.

36.   As to claim 21, Chow teaches (a) determining that one of the set of non-empty queues has become empty; (b) saving the system reference-use and a current real-time value associated with the now-empty queue; (c) determining that the now-empty queue has become non-empty; and (d) updating a virtual time for the now-non-empty queue responsive to step (c) and further responsive to the saved system reference-use, the saved current real time, and the system reference-use *(fig.6 and associated text)*.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teachings of Jones and Chow because Chow's teaching would have provided a more efficient bandwidth distribution.

37.   As to claim 22, Chow teaches the system reference-use is updated to converge towards a virtual time average over the non-empty queues *(fig.6 and associated text)*.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teachings of Jones and Chow because Chow's teaching would have provided a more efficient bandwidth distribution.

38.   As to claim 23, the rejection of claim 13 above is incorporated herein in full. Claim 23 further recites a weight assigned to the active one of the plurality of queues.

Jones does not explicitly teach a weight assigned to the active one of the plurality of queues.

Chow teaches a weight assigned to the active one of the plurality of queues *(col.12, lines 27-65)*.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teachings of Jones and Chow because Chow's teaching would have provided a more efficient bandwidth distribution.

39.   As to claim 24, the rejection of claim 14 above is incorporated herein in full. Claim 24 further recites a weight assigned to the active one of the plurality of queues.

Note the discussion of claim 23 above for rejection of "a weight assigned to the active one of the plurality of queues."

40.   As to claim 25, the rejection of claim 15 above is incorporated herein in full. Claim 25

adding a new queue to the plurality of queues.

Jones does not explicitly teach adding a new queue to the plurality of queues.

Chow teaches adding a new queue to the plurality of queues *(col.11, lines 46-65)*.

It would have been obvious to a person of ordinary skill in the art at the time the

invention was made to combine the teachings of Jones and Chow because Chow's teaching

would have provided a more efficient bandwidth distribution.

41.   As to claim 26, Chow teaches adjusting each of the set of empty queues by the

adjustment value when the system reference-use is updated *(fig. 6 and associated text)*.

It would have been obvious to a person of ordinary skill in the art at the time the

invention was made to combine the teachings of Jones and Chow because Chow's teaching

would have provided a more efficient bandwidth distribution.

42.   As to claims 27-29, they include the same limitations as in claims 22-24 and are

similarly rejected under the same rationale.

43.   As to claims 45-54, note the rejection of claims 16-29 above. Claims 45-54 are the same

as claims 16-29, except claims 45-54 are apparatus claims and claims 16-29 are method claims.

Conclusion

44.   The prior art made of record and not relied upon is considered pertinent to applicant's

disclosure.

- Takeuchi et al. (U.S.5944778) teaches "Periodic process scheduling method."

- Baker-Harvey (U.S. 6385638) teaches "Processor resource distributor and method."

- Kamada et al. (U.S. 6668269) teaches "Computer system process scheduler determining and executing processes based upon changeable priorities."."

- Marsan et al. "RPA: a flexible scheduling algorithm for input buffered switches" pp. 1-4, 1988 IEEE.

- Hui "Predictive queueing multiple access-a wireless ATM protocol for multimedia communication" pp. 107-111, 1997 IEEE.

45.   Any inquiry concerning this communication or earlier communications from the examiner should be directed to VAN H NGUYEN whose telephone number is (703) 306-5971. The examiner can normally be reached on Monday-Thursday from 8:30AM - 6:00PM. The examiner can also be reached on alternative Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Meng-Ai An can be reached on (703) 305-9678.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-9000.

Any response to this action should be mailed to:
Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450
or fax to:
(703) 746-7239 (for formal communications intended for entry)
(703) 746-7238 (for After Final communications)
(703) 746-7240 (for informal or draft communications)

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